

China Rare Earth Information

China Rare Earth Information Center

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Rare Earth Market – Part I: Supply and Demand

Editor Note: When we look back into the past two decades, rare earth, the small and highly internationalized industry has experienced several ups and downs. The factors responsible for the turbulence are rather complicated, but one thing is certain: the supply can not properly match the demand. Upon entering into the new century, it seems that the world's rare earth circles are now greeting another turn of the ups. Reports say that many existing producers are trying to enlarge their production capacity and some new comers are working hard to make entrance into the markets so as to catch zip with this high wave with great hope that this turn is expected to be a long one. But one may wonder how long it will last? Mr. Junxi Yan, the director of CREIC and the chief editor of CREI Newsletter writes this series of reports based on vast available information, aiming at sharing views with you. And you are encouraged to air your view through CREI Newsletter on the topics of world's rare earth markets, especially the application markets in hi-tech industries so as to help the world's rare earth industry to be developed smoothly.

1. General Review

Rare earth entered into hi-tech epoch in early 1980s following the inventions of rare earth hi-tech new materials such as NdFeB magnet, and Y-Ba-Cu-O high temperature superconductor and so on. Driven by the rapid growth of hitech industries, rare earth industry entered into the fast development period in 1990s. The consumption of rare earth in the world was soared up from 33,000 ton REO in 1990 to 75,000 ton REO in 1999, showing an increase of 1.3 times with an annual average growth rate of 9.6%. The driven force is the rare earth new material. Here just give two examples. One is NdFeB magnets. The turnout of the magnets in the period was increased by 8.3 times from 1,753 ton in 1990 to 16,240 ton in 1999 with an annual average growth rate of 28.1%. And the consumption of neodymium in the field alone was increased accordingly by 8.3 times from 682 ton REO in 1990 to 6,316 ton REO in 1999 with an annual average growth rate of 28.1%, and that of dysprosium increased by 8.6 times from 42 ton REO in 1990 to 405 ton REO in 1999 with an annual average growth rate of 28.6% during the past decade. The major users of the magnets are the computer-led hi-tech industries which the experts in the fields predict will be kept at a high growth rate in the coming decade, so will the magnets. Another example is rare earth NiMH rechargeable batteries. The turnout of the cells in Japan alone reached 868 million pieces in 1999 from 72 million pieces in 1993, increased by 11 times in 7 years with an annual average growth rate of 51%. Other rare earth new materials includes phosphors, advanced ceramics, fiber optics, magnetostrictive alloy, auto catalysts, magneto-optics, magnetic refrigeration alloy and so on. Some have already become the leading consumers of rare earth, and others will do soon.

2. Supply

Statistics showed that the global consumption of rare earth in 1999 was 75,000 ton REO. And in the year, China's turnout of rare earth products was 60,000 ton REO, domestic consumption was 16,000 ton REO and export of rare earth was 50,000 ton REO. The total of domestic consumption and export in China was 66,000 ton REO. Therefore, China has provided 88.0% of the world's total rare earth consumption in 1999, becoming the sole leading supplier of rare

earth on the international market. Then what happened in rare earth production in other rare earth-owned countries such as USA and CIS(former Soviet Union)?

USA used to be the largest rare earth producer and consumer in the world before the emergence of China's rare earth in the middle of 1980s. But now it has stepped down from the position of leading rare earth supplier yet remains as the leading consumer of rare earth in the world. This could be approved from its key trade partner, Japan's rare earth import from USA in recent years. In 1996, Japan's import of rare earth from USA was 2,774 ton, accounting for 14.3% of total Japanese import, and in the following 2 years, Japan's import of rare earth had increased steadily, but its import from USA decreased sharply. Then in 1999, Japan's import from USA was only 609 ton, accounting for 2.5% of its total import. There may be many factors contributing to the reduction of rare earth production in USA, but the key one is the cost for Molycorp, the leading rare earth producer in USA is the only company in the world that recovers rare earth as the only target mineral, hence its production cost can not compete against that in China where most of the rare earth products are recovered as byproducts. As a matter of fact, USA has become a rare earth importing country in recent years. In 1999, the US import of rare earth from China reached 17,600 tons, becoming China's second largest rare earth export partner in the world (only next to Japan).

Australia and India are two major owners of the proven monazite reserves in the world where monazite is recovered as byproduct of processing heavy minerals. Monazite contains radioactive elements such as uranium and thorium, thus challenging the environment when being processed. In addition, the availability of monazite concentrate is influenced by the market demand for other heavy minerals. Therefore, the rare earth turnout in India has not responded actively to the growing market demand. The recent report says that a high grade rare earth deposit is discovered in Australia with low content of radioactive elements and the deposit is not at the stage of process development, and the owners of the mine aim at sharing several percentage of the world's raw material market. If yes, it could be regarded as the return of Australia on the global rare earth market since the shut down of its monazite operation in 1990s because of the shift of Rhone-poulenc's raw material from Australian concentrate to Chinese rare earth chloride and carbonate.

It is reported that CIS, the former Soviet Union, owns 19 million ton REO of rare earth reserves, but 98% of the reserves are located in Russia, which are not only scattered in many deposits, but also contain low grades of rare earth in composite minerals. In addition, the disintegration of the former Soviet Union has made its originally well established rare earth facilities belong different CIS countries now and each country owns a certain section, thus having slowed down the development of rare earth industry in CIS as a whole. It will take time if the CIS countries try to well establish its own rare earth industries in each country, but it seems rather risky to invest heavily in the basic rare earth facilities now because of the impact of the low price rare earth products from China which are readily available in large quantities.

France does not have rare earth resources of its own. Rhodia, the only rare earth processor in France, is the world's largest producer of high purity rare earth individuals. The company used to import monazite concentrate from Australia. The company's purchase then was several thousand to ten thousand ton of the concentrate per annum. But now, it has shifted its raw materials from the Australian monazite to the Chinese rare earth chloride/carbonate. Rhodia has already had a rare earth joint venture in China and is now searching for the way to strengthen its involvement in rare earth production in China.

There are several other countries reporting to have rare earth resources such as Brazil, South Africa, and Turkey. But they do not appear to develop the resources in a short run, again because of the pressure from China's rare earth products.

Now back to the reality. China owns the world's largest light rare earth deposit, Baiyunebo, Baotou where several hundred thousand tons of rare earth oxides have been coming out together with iron mining each year since it was in operation in 1950s, only a small part of the

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rare earth is recovered now and most of it has been stored in the tailing dam that is readily recovered to meet the market development. China is the only country that owns rare earth ion-absorption clay minerals some of which are rich in heavy rare earth and others are also rich in light rare earth. So China now is the only country in the world that can provide all kinds of different rare earth products in large quantities at competitive prices. Therefore it is natural that China becomes the dominant supplier of rare earth on the global market and it is actually the result of market economy that only allows those who own the best disposition of production elements to survive.

3. Demand: Regional Market

As stated above, the world's total consumption of rare earth was some 75,000 ton REO in 1999. North America, mainly USA, took the largest share, accounting for 27% of the world total consumption, which was followed by Japan and China, taking 22% of the total each. Other southeast countries excluding China and Japan and Europe took 13% respectively and the balance 3% was taken by the rest of the world.

These data showed that 84% of the world rare earth consumption in 1999 went to Asia-Pacific regions, becoming the largest rare earth consuming markets; yet there reserves large rooms for rare earth applications in other continents such as Africa and Latin America.

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